REMARKS

The Examiner is thanked for the careful examination of the application. However, in view of the foregoing amendments and the remarks that follow, the Examiner is respectfully requested to reconsider and withdraw the outstanding rejections.

Drawings:

In accordance with the request by the Examiner a Request for Drawing Corrections is submitted concurrently herewith, wherein "extracter" in Figure 1 has been changed to "extractor".

With regard to the subject matter of claims 18 and 19, one embodiment of the filters along a circumferential line is illustrated in Fig. 6. Filters 1 through 12 relate to an outer circle or circumferential line and filters 13 through 16 relate to an inner circle.

Specification:

In accordance with a request from the Examiner, the term "extracter" has been changed to "extractor" at lines 17 and 20.

Art Rejections:

Claims 16, 20 and 22 have been rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by U.S. Patent No. 6,301,386, hereinafter Zhu. In response to the rejection, claim 16 has been amended to more clearly distinguish the invention over the applied prior art. Specifically, amended claim 16 defines a specified pattern

detection apparatus that includes a plurality of filters provided for detecting an image at a first resolution, an extractor which extracts a specified pattern included in the image with a combination of filters, a circuit for generating an image of the specified pattern at a resolution lower than the first resolution, and a calculator which determines the position of the specified pattern more precisely than the extractor, based on the position determined by the extractor in the lower resolution image. Support for the amendment may be found at page 6, lines 11-14, and other places.

As now amended, the apparatus of claim 16 uses a plurality of filters to detect an image at a first resolution. After a specified pattern in the image is detected, a circuit generates an image of the specified pattern at a resolution lower than the first resolution. The calculator then determines the position of the specified pattern based on the lower resolution data. As set forth at column 2, lines 10-12, because the final position calculator is determined using lower resolution data, the present invention can operate at a higher speed, and at a higher precision with a simpler structure. In contrast to claim 16, Zhu receives gray image data at step 102 and then initially reduces the resolution of the data in the subsampling step 103. However, all of the filtering and identification steps subsequent to that are performed on the data at the same resolution. There is no subsequent reduction of the resolution of the image. Thus, Zhu does not teach the steps acting upon data at different resolutions as is now set forth in claim 16.

Accordingly, amended claim 16 is clearly patentable over Zhu.

Claim 20 depends from claim 16, and is thus also patentable over Zhu.

Claim 22 has been amended in a manner somewhat similar to claim 16 in that it now includes the step of generating an image at a resolution lower than the first

resolution of the specified pattern, and the further determining the position step is based on the determined position and the lower resolution image. Accordingly, claim 22 is also patentable over Zhu at least for the reasons set forth above with respect to claim 16.

Claims 17-19, 21 and 23- 26 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhu in view of U.S. Patent No. 5,390,003, hereinafter Yamaguchi. Claim 17 has now been rewritten in independent form. Claim 17 includes the "reduced image generator" which generates a reduced image of an image including the specified partial images. A reduced image has a lower resolution than the image including the specified partial images. Accordingly, claim 17 defines a specified pattern detection apparatus that functions on image data at two different resolutions. As set forth with respect to claim 16, Zhu does not teach or suggest this structure.

The Examiner recognizes that Zhu does not teach binarizing the input image. The Examiner relies upon Yamaguchi for its alleged teaching of binarizing the image data. However, Yamaguchi does not overcome the deficiency of Zhu set forth above. Accordingly, claim 17, which includes the structure for analyzing the image data at two different resolutions, is not taught or suggested by the combination of Zhu and Yamaguchi.

Claims 18 and 19 depend from claims 16 and 17, and are thus patentable over Zhu in view of Yamaguchi at least for the reasons set forth above with respect to claim 17.

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Elected Claims 18, 19 and 21:

Claim 23 has been rewritten in independent form. Claim 23 also defines a method that operates on image data at two different resolutions. Note the step of generating a reduced image of an image including the specified partial images, the reduced image having a lower resolution than the image including the specified partial images. As set forth above, this structure is not taught or suggested by Zhu or Yamaguchi, either singularly or in combination.

Claims 24 and 26 have been amended to clarify that the gain calculator calculates and stores information for each pixel in the bi-level image. Support for the amendment may be found at page 8, lines 4-7. Neither of the prior art reference Zhu nor Yamaguchi teach or suggest the fact that information for each pixel in the bi-level image is not only calculated, but also stored, so that it can be used for decreasing processing speed in a subsequent processing step. See page 8, lines 7-9.

Accordingly, claims 24 and 26 are patentable over the combination of Zhu and Yamaguchi.

Claim 25 depends from claim 24, and is thus also patentable over the applied prior art at least for the reasons set forth above with respect to claim 24.

In view of the foregoing amendments and remarks, the Examiner is respectfully urged to reconsider and withdraw the outstanding rejections.

In the event that there are any questions concerning this Amendment, or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution of the application may be expedited.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

Date: August 19, 2004   By: _William C. Rowland_

William C. Rowland
Registration No. 30,888

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

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Fig.1

8-BIT R,G,B

┌─────────────┐ 1
│ IMAGE INPUT │
└─────────────┘

┌─────────────┐ 2
│ BINARIZER │
└─────────────┘

┌─────────────┐ 3
│   ELEMENT   │
│ EXTRACTER │
└─────────────┘

┌──────────────┐ 4
│ CONTRACTED │
│ IMAGE GENERATOR │
└──────────────┘

┌──────────────┐ 5
│ SCORE MAP   │
│ GENERATOR   │
└──────────────┘

┌──────────────┐ 7
│   ADDRESS   │
│ CALCULATOR │
└──────────────┘

┌──────────────┐ 8
│ MARK DETECTOR/ │
│ FILTER/SUM   │
│ CALCULATOR   │
└──────────────┘

┌──────────────┐ 9
│ IDEAL POSITION │
│ CALCULATOR   │
└──────────────┘

┌──────────────┐ 10
│   OUTPUT   │
└──────────────┘

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MEMORY